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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,890	10/21/2003	Yoshiharu Iyoda	244147US0	2763

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EXAMINER	
KESSLER, CHRISTOPHER S	
ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 10/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/688,890	IYODA ET AL.	
	Examiner	Art Unit	
	Christopher Kessler	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07/18/2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-16 and 18-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-16 and 18-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. In view of Applicant's Response received July 18, 2006, amendments to claims 10 and 11 and addition of new claims 24 and 25 are acknowledged. Therefore, claims 10-16 and 18-25 are currently under examination.

Status of Previous Rejections

2. The rejection of Claims 10-16 and 18-23 under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al. in view of Kawato et al. is withdrawn in view of the amendment dated 18 July 2006.

3. The rejection of Claims 10-17 under the judicially created doctrine of obviousness-type double patenting has been withdrawn in view of the amendment dated 18 July 2006.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior office action.

5. Claims 10-16 and 18-25 are rejected under 35 USC 103 (a) as being unpatentable over Hayashi et al. in view of Kawato et al., taken in view of Lefebvre ('729).

6. Regarding Claim 10, Hayashi et al. teaches a soft magnetic green compact made from an iron containing powder (col. 2, line 44) and a resin binder powder (col. 7, lines 13-22).

However, Hayashi et al. is silent with regard to compression molding or heat treatment steps, and does not disclose amounts of binder in the range of 0.01-0.50 weight percent after molding.

With regard to the processing steps and binder amounts of Claim 10, Kawato et al. teaches to use less binder when using a compression molding technique than an injection technique, using binder in amounts of 0.1 to 5% when using compression molding (col. 7, lines 55-62), which thus would result in final binder amounts within the range as claimed by Applicant.

However, neither Hayashi et al. nor Kawato et al. teach a heat treatment in oxidizing ambient to oxidation bond iron powder as claimed. The claims 10-16 and 18-25 are product-by-process claims. It is noted that applicants have disclosed in the specification that the claimed processing limitation of oxidation bonding led to different properties in the product claimed.

Lefebvre ('729) discloses that in a soft magnetic green compact, the oxidation bonding between iron powder particles obtained by heating in oxidizing atmospheres provides enhanced strength (see col. 2, lines 55-65, col. 3, lines 31-60, and Claim 1).

It would have been obvious to one skilled in the art at the time invention was made to combine the compression molding and binder range disclosed in Kawato et al., and the oxidation bonding disclosed by Lefebvre ('729) with the soft magnetic green compact of Hayashi et al. to make a soft magnetic green compact that had oxidation bonding to provide enhanced strength compared to resin bonded compacts, as disclosed by Lefebvre ('729).

7. Regarding Claim 11, Hayashi et al., Kawato et al., and Lefebvre ('729) are applied to the claim for the same reasons as stated above.

Neither Hayashi et al. nor Kawato et al. teach a soft magnetic green compact including an iron system powder with an insulation coating.

With regard to the limitation of iron powder with insulation coating, Lefebvre ('729) discloses that in a soft magnetic green compact, the iron powder particles may be treated in such a way as to create a thin insulation coating (see col. 5, line 19-col. 6, line 62).

It would have been obvious to one skilled in the art at the time invention was made to treat the iron powder to create a thin insulation coating to increase the resitivity of the outer layer of the particles in order to reduce eddy current loss as taught by Lefebvre ('729), cited above.

8. Regarding Claim 12, Hayashi et al. teaches the use of various resin materials, including a polyamide system resin (col. 7, line 13-22). Kawato et al. and Lefebvre ('729) are relied upon as described above. With regard to the limitation imposed that the binder powder be less than 200 μm, Hayashi et al. recommends that the particle size of recycled magnet material be ground to less than that size in order to process the material (see col. 7, lines 13-22).

It would have been obvious to one skilled in the art at the time invention was made to make a soft magnetic green compact with polyamide materials in resin binders as taught by Hayashi in order to enhance the strength and make the compact easier to

handle, and to use polymer powder with particle size less than that of the magnetic powder in order to facilitate molding.

9. In regards to Claim 13, Hayashi et al. teaches the use of a resin with thermoplastic and thermosetting components (col. 7, lines 13-22). Kawato et al. and Lefebvre ('729) are relied upon as discussed in the previous rejections.

Hayashi is silent with regard to the melting point of the thermoplastic component of the resin.

Kawato et al. refers to the thermoplastic resin preferably having a melting point of at least 200° C (see col. 25 line 65-col. 26, line 19).

It would have been obvious to one skilled in the art at the time of invention to prepare a soft magnetic green compact with resin containing both thermoplastic and thermosetting components as taught by Hayashi in order to enhance strength and ease of manufacture.

10. Regarding Claim 14, Hayashi et al. teaches the use of various resin materials, including a polyphenylene sulfide system resin (col. 7, line 13-22). Kawato et al. and Lefebvre ('729) are relied upon as discussed in the previous rejections.

It would have been obvious to one skilled in the art at the time invention was made to prepare a soft magnetic green compact with polyphenylene sulfide as taught by Hayashi in order to provide enhanced strength and ease of manufacture.

11. Regarding Claim 15, Hayashi et al. and Kawato et al. are relied upon as discussed above.

Neither Hayashi et al. nor Kawato et al. teaches the heat treatment of soft magnetic green compacts in oxidizing ambient.

Lefebvre ('729) teaches heat treating soft magnetic green compacts in oxidizing ambient at temperatures falling within the range 100-450° C to encourage oxidization of the metal powder compacts in order to enhance strength (see col. 5, lines 4-17).

It would have been obvious to one skilled in the art at the time invention was made to heat treat a soft magnetic green compact with oxidizing atmosphere at temperature in the range of 100-450° C, as taught by Lefebvre ('729) in order to enhance the strength, as disclosed by Lefebvre ('729) cited above.

12. With respect to Claim 16, Hayashi et al. and Kawato et al. are relied upon as discussed above.

Neither Kawato et al. nor Hayashi et al. disclose soft magnetic green compacts with density in the range of 6.6-7.4 g/cm^3.

Lefebvre ('729) discloses soft magnetic green compacts strengthened with oxidation bonding that have density values that fall into the range of 6.6-7.4 g/cm^3 (see col. 6, Table 1).

It would have been obvious to one skilled in the art at the time invention was made to make a soft magnetic green compact with high relative density as taught by Lefebvre ('729) in order to enhance the strength.

Regarding Claim 18, Hayashi et al., Kawato et al., and Lefebvre ('729) are applied to the claim for the reasons stated above.

It would have been obvious to one skilled in the art at the time invention was made to combine the compression molding and binder range disclosed in Kawato et al., and the oxidation bonding disclosed by Lefebvre ('729) with the soft magnetic green compact of Hayashi et al. to create a soft magnetic green compact with oxidation bonding to provide enhanced strength at high temperature, as taught by Lefebvre ('729).

13. In regards to Claim 19, Hayashi et al. and Kawato et al. are relied upon as discussed above.

Neither Hayashi et al. nor Kawato et al. teach a heat treatment in oxidizing ambient to oxidation bond iron powder with an insulating coating.

Lefebvre ('729) discloses that the oxidation bonding between iron powder particles coated by an insulation film obtained by heating in oxidizing atmospheres provides enhanced properties in a soft magnetic green compact (see col. 4, lines 33-43).

It would have been obvious to one skilled in the art at the time invention was made to combine the compression molding and binder range disclosed in Kawato et al., and the oxidation bonding and insulation coating disclosed by Lefebvre ('729) with the soft magnetic green compact of Hayashi et al. to create a soft magnetic green compact with coated insulation film and oxidation bonding in order to provide enhanced strength at high temperature.

14. Regarding Claim 20, Hayashi et al. and Kawato et al. are relied upon as discussed above.

Neither Hayashi et al. nor Kawato et al. teaches the heat treatment of soft magnetic green compacts in oxidizing ambient.

Lefebvre ('729) teaches heat treating soft magnetic green compacts in oxidizing ambient at temperatures less than 300° C to encourage oxidization of the metal powder compacts (see col. 5, lines 4-17).

It would have been obvious to one skilled in the art at the time invention was made to heat treat a soft magnetic green compact with oxidizing atmosphere at temperature in the range of 250-450° C in order to enhance the strength, as taught by Lefebvre ('729).

15. With respect to Claim 21, Hayashi et al. and Kawato et al.applied to the claim for the same reasons stated above.

Neither Hayashi et al. nor Kawato et al. teaches the heat treatment of soft magnetic green compacts in oxidizing ambient.

Lefebvre ('729) teaches heat treating soft magnetic green compacts made from iron powder particles with insulating coating in oxidizing ambient at temperatures less than 600° C to encourage oxidization bonding (see col. 5, lines 4-17).

It would have been obvious to one skilled in the art at the time invention was made to heat treat a soft magnetic green compact with oxidizing atmosphere at temperature in the range of 250-450° C in order to enhance the strength, as taught by Lefebvre ('729).

16. Regarding Claim 22, Hayashi et al. and Kawato et al. are relied upon as discussed above.

Neither Hayashi et al. nor Kawato et al. teaches the use of phosphoric acid to create an iron phosphate coating.

The use of phosphoric acid to form an insulating layer on the surface of iron powder is well known in the art. For example, Lefebvre ('729) discloses phosphatation of the iron powder to be made into a soft magnetic green compact (see col. 4, lines 38-39).

It would have been obvious to one skilled in the art at the time invention was made to treat iron powder with phosphoric acid and other chemicals to create a thin insulation film, as taught by Lefebvre ('729) and others, in order to protect the magnetic properties of the iron powder to be used for a soft magnetic green compact, as shown in Lefebvre ('729), cited above.

17. Regarding Claim 23, Hayashi et al. and Kawato et al. and Lefebvre ('729) are applied to the claim as stated above.

It would have been obvious to one skilled in the art at the time invention was made to create a soft magnetic green compact with coated insulative layer and oxidation bonding in order to provide enhanced strength at high temperature as taught by Lefebvre ('729).

18. With respect to Claim 24, Hayashi et al. is relied upon as stated in previous paragraphs. Lefebvre ('729) is relied upon as stated above.

Hayashi does not disclose a composition of resin powder within the range of 0.10-3.00 weight percent.

Kawato et al. teaches the use of resin amounts that overlap the claimed range (see col. 7, lines 55-62).

It would have been obvious to one skilled in the art at the time of invention to create a soft magnetic green compact with resin binder falling within the range of 0.10-3.00 weight percent as taught by Kawato et al. in order to make a soft magnetic green compact stronger and easier to manufacture.

19. Regarding Claim 25, Hayashi et al., Kawato et al. and Lefebvre ('729) are applied to the claim for the reasons stated above.

It would have been obvious to one skilled in the art at the time of invention to create a soft magnetic green compact with resin binder falling within the range of 0.10-3.00 weight percent as taught by Kawato et al. in order to make a soft magnetic green compact stronger and easier to manufacture.

Response to Arguments

20. The Examiner has carefully considered the arguments presented in Applicant's Response to Non-Final Rejection. Applicant's arguments with respect to the amendments to Claims 10, 11 and 15 have been considered but are moot in view of the new grounds of rejection. Applicant argued that the combined references of Hayashi and Kawato would not make it obvious to one skilled in the art at time invention was made that oxidation bonding was advantageous for a soft magnetic green compact to improve strength at elevated temperature. The Examiner agrees with this position, as each of those references explicitly teaches the avoidance of oxidation of the iron system powder.

Neither Hayashi nor Kawato teaches the use of oxidation bonding to enhance the strength of soft magnetic green compacts through heat treatment in oxidizing ambient. However, this method of strengthening soft magnetic green compacts is explicitly described in US Patent no. 5,993,729 issued to Lefebvre, et al. (hereafter referred to as "Lefebvre ('729)"). In Claim 1, Lefebvre ('729) claims:

> 1. A method of producing iron-based powder elements, the method comprising the steps of:
>
> providing a compacted iron-based powder element composed of binder-free particles of iron or iron-based compound or alloy, and
>
> heating said compacted element in an oxygen-containing atmosphere to a temperature below sintering temperature for a time sufficient to bind said particles together and increase the mechanical strength of said compacted element.

Lefebvre ('729) teaches heat treating in an oxidizing atmosphere to induce oxidation bonding, thereby enhancing the mechanical strength and electrical resistivity of iron powder compacts for use as soft magnetic materials (see col. 2, lines 55-65, col. 3, lines 31-60, and Claim 1). Lefebvre further discloses the use of oxidation bonding to improve the strength of soft magnetic green compacts wherein a resin binder is impregnated into the compact before heat treatment (see claims 13 and 14) or wherein the iron particles are individually coated before compaction (see claim 18). Lefebvre ('729) still further discloses that the insulating film coated onto the iron powder may be of the phosphate type (see col. 4, lines 33-43). Lefebvre ('729) specifically teaches that the coated particles will oxidation bond through the insulating layer.

It would have been obvious to one skilled in the art at the time invention was made to combine the teachings of Hayashi and Kawato in view of Lefebvre ('729) to

make the soft magnetic green compacts as described in the present application in order to enhance the green strength at elevated temperature.

Applicant's amendment of Claims 10 and 11 to restrict the resin powder composition amount to 0.01-0.50 weight percent after compression molding and heat treatment is not sufficient to overcome the previous rejection dated 4/18/2006, as there is no showing to rebut the previous assertion that the process disclosed in Hayashi et al. taken in view of Kawato et al. would result in a similar product.

The limitations imposed by new claims 24 and 25 have already been discussed in a prior office action, and the present grounds for rejection are repeated above.

The non-statutory provisional double patenting rejections of Claims 10-17 over Claims 1-3, 5, 8-11 and 16-19 in application 10/321,377 have been obviated. Application 10/321,377 was allowed as Patent 7,033,413, dated April 26, 2006. The claims in issued U.S. Patent 7,033,413 are patentably distinct from the claims set forth in the present application. Although the disclosure of Patent 7,033,413 sufficiently describes the claims of the present application, there is no statutory basis for an obviousness type rejection based thereupon. Therefore, the provisional non-statutory obviousness-type double patenting rejection of prior office actions is withdrawn.

Conclusion

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references relate either to the field of the invention or to the subject matter of the invention, but are not relied upon in the rejections or

record: 6548012, 4601765, 4497722, 2004/0099346, 2002/0039667, 5211896, 3245841, 7060350, 6949786, 7033413, 6340397, 6641919.

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Kessler whose telephone number is (571) 272-6510. The examiner can normally be reached on Mon-Fri, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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